

Part I

Conservation

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The Odyssey of the African Buffalo

The African continent hosts a unique diversified megafaunal assemblage, one which exceeds that of any other biogeographical region of the world. The African buffalo is the largest African bovid and occurs throughout most of sub-Saharan in a wide range of ecosystems, from savanna to rain-forest. It exhibits a marked morphological polymorphism across its range, greater than most other African mammals, both in body size and weight, but also in pelage colour and horn shape. The African buffalo is also one of the most successful large African mammals in terms of abundance and biomass. In this context, this species represents a powerful model to enhance our understanding of African biogeography and wildlife conservation.

Buffalo, together with around 80 per cent of ungulates (hoofed mammals), belong to the bovid family, characterized by the presence of two or rarely four unforked horns (at least in the adult male). In Africa, this family, which includes the true antelopes and the African buffalo, emerged some 2.8 million years ago following the increase of open habitats and the expansion of grasslands.

Since the differentiation of African buffalo, which took place some 500,000 years ago, major climate fluctuations during the Quaternary shaped distribution range and caused population oscillations. The expansion of the equatorial rainforest towards eastern Africa during pluvial periods periodically formed a major biogeographical barrier to gene flow between savanna populations. This is why African wildlife species with a continental distribution pattern show a biogeographical pattern structured north and south of the equatorial forest belt. In the African buffalo, this resulted in the emergence of two main genetic lineages: *Syncerus caffer caffer* in eastern and southern Africa, and *S. c. nanus* in western and central Africa.

In addition to climate change, humans and their newly domesticated animals have posed a worldwide ecological threat to wildlife since the beginning of the Holocene epoch (about 12,000 years ago). The Holocene resulted in the extinction of many mammals weighing more than 40 kg. Nevertheless, such a drastic reduction did not occur in Africa, where humans and wildlife had long coevolved (with the exception of some species like the giant long-horned buffalo (*Pelorovis antiquus*); Chapter 2).

In Africa, anthropogenic pressure on African wildlife took on an unprecedented scale from the Neolithic revolution onwards, marked in eastern and southern Africa by the Bantu expansion. From about 3000 BC until AD 1800, human populations originating from present-day Cameroon, Central African Republic and Congo undertook a long series of migrations and settled eastern and southern Africa, which until then had been occupied by small populations of nomadic hunter-gatherers for the past 100,000 years. These migrants brought with them several important commodities and skills, such as domesticated animals (including cattle), cultivation of crops (millet, sorghum, etc.) and the manufacture of metal weapons. This revolution, together with climatic factors, resulted in a strong decline of Cape buffalo populations as shown by recent genetic investigations (Chapter 3).

About 130 years ago, another major crisis hit the African buffalo populations on a continental scale. The introduction of the exotic rinderpest morbillivirus in 1889 by a colonial military expedition to the Horn of Africa caused up to 95 per cent mortality among buffalo populations, wildebeest and cattle across Africa. This was followed by other episodes throughout the twentieth century, until its official eradication in 2011 (last case reported in 2001; Chapter 4). Despite an extremely high mortality rate reported at the continental scale, the Great Rinderpest pandemic apparently had very low impact on the genetic diversity of the African buffalo, as shown by recent studies (Chapter 3). Throughout the twentieth century, buffalo populations gradually recovered, but obviously not to the levels that prevailed before the Great Rinderpest pandemic of the 1880s.

The sub-Saharan human population grew exponentially throughout the twentieth century, increasing from 95 million in 1900 to 1.1 billion by 2020. According to current projections, this figure could reach 1.8 billion in 2050 (i.e. a nearly 20-fold increase in 150 years). To meet the needs of the human populations in Africa and the raw material needs of the rest of the world, many natural habitats have been transformed or

severely degraded, and what remains is under increasing pressure. The original distribution range of the African buffalo and wildlife in general therefore was (and still is being) progressively reduced and relegated to protected areas, which today cover around 16 per cent of the total land area. However, in the face of human pressure, the integrity of numerous protected areas has been jeopardised. Hence, the overall number of large mammals in Africa within protected areas decreased by 60 per cent between 1970 and 2005 and by about 85 per cent in Western Africa during that same period.

In response to this major crisis, African governments together with the international community have mobilized in recent decades, and conservation efforts are beginning to bear fruit. As we will see in Chapter 4, African buffalo populations have stabilized overall over the last 20 years. However, these figures conceal major disparities between regions, as well as the concentration of wildlife populations in the besieged fortresses that protected areas have become.

